

<b>Office Action Summary</b>	<b>Application No.</b> 10/565,380	<b>Applicant(s)</b> OTA ET AL.
	<b>Examiner</b> KABIR A. TIMORY	<b>Art Unit</b> 2611

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 May 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,6 and 8 is/are rejected.
- 7) ☒ Claim(s) 9-12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### Response to Arguments

1. This final office action is in response to the amendment filed on 05/23/2011. Claims 1, 4, 6, and 8-12 are pending in this application and have been considered below. Claims 2-3, and 5 are withdrawn from consideration and claim 7 is cancelled by the applicant.

2. The rejection under 35 USC 112 1st paragraph to claims 1, 4-6, and 8-12 is corrected by the amendment/clarification of the specification. Therefore, the rejection is withdrawn.

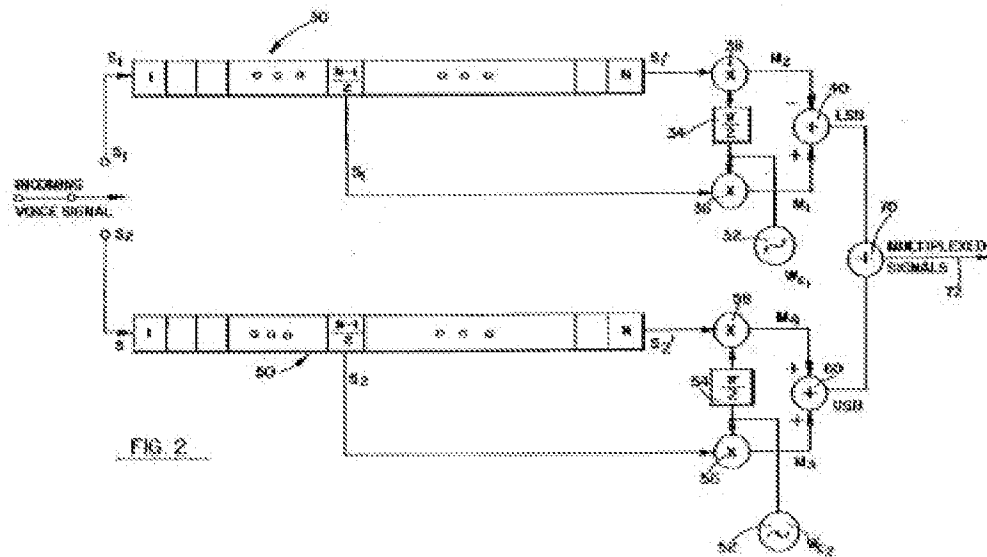
3. Applicant arguments regarding the rejection under 35 U.S.C. 103(a) as being unpatentable over Daoud et al. (US 4835791) in view of Muzzi et al. (US 3628155) have been fully considered but they are **not persuasive**. The examiner thoroughly reviewed Applicant's arguments but firmly believes that the cited reference reasonably and properly meets the claimed limitation as rejected.

**Applicant's argument:** Therefore, it naturally follows that Daoud does not disclose the feature of "wherein the second frequency-increasing SSB modulator performs SSB modulation to obtain the LSB signal using a carrier frequency, the carrier frequency being higher than a carrier frequency used in the first

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frequency-increasing SSB modulator by a symbol frequency of the first input symbol and the second input symbol, such that the LSB signal and the USB signal are multiplexed in the same frequency band," as recited by claim 1. Muzzi does not supplement the teachings of Daoud in this regard.

**Examiner's response:** In column 4, lines 38-49, Daoud explicitly discloses that "**Preferably the frequency of the second carrier signal wc2 used in the upper sideband generator is slightly higher than the frequency of the first carrier signal wc1 used in the lower sideband generator, so there is a frequency gap between the lower sideband signal and the upper sideband signal**". Although, Daoud teaches that "Preferably the frequency of the second carrier signal wc2 used in the upper sideband generator is slightly higher than the frequency of the first carrier signal wc1 used in the lower sideband generator, so there is a frequency gap between the lower sideband signal and the upper sideband signal (**see col 4, lines 38-49**), it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Daoud to switch the carrier frequencies (Wc1 and Wc2) of Daoud and applying Wc2 to the LSB modulation and Wc1 to the USB modulation in order to yield predictable results (**see KSR – some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art teaching to arrive at the claimed invention**").



Daoud discloses all of the subject matter as described above including a multiplexing summer (**70 in figure 1**) which produces multiplexed signals (**see the output of the summer 70 in figure 1**) except for specifically teaching such that the LSB signal and the USB signal are multiplexed in the same frequency band.

However, Muzzi in the same field of endeavor teaches such that the LSB signal and the USB signal are multiplexed in the same frequency band. For example in 8, col 2, lines 16-28, Muzzi discloses: "The IF carrier frequency in both of the above cases is determined by the difference in frequency between the original carrier and the local oscillator. **If both local oscillators are chosen such that the IF carriers produced are at exactly the same frequency and in phase,** a comparison can be performed on the sideband symmetry. The lower sideband of **the normal frequency spectrum is at the same frequency** and in phase with the upper sideband of the inverted frequency spectrum and vice

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versa. The two local oscillator frequencies may be provided in several ways, two of which will be shown hereinafter.

If the two IF signals of the FIGS. 2 and 3 are added, the frequency spectrum for the resulting signal is as shown in FIG. 4".

Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to substitute the summer as taught by Muzzi to for the summer of Daoud in order to obtain predictable results (**KSR – simple substitution of one known element for another to obtain predictable results**).

Accordingly, both Daoud and Muzzi clearly teaches the argued limitation "wherein the second frequency-increasing SSB modulator performs SSB modulation to obtain the LSB signal using a carrier frequency, the carrier frequency being higher than a carrier frequency used in the first frequency-increasing SSB modulator by a symbol frequency of the first input symbol and the second input symbol, such that the LSB signal and the USB signal are multiplexed in the same frequency band," as recited by claim 1.

### ***Claim Rejections - 35 USC § 103***

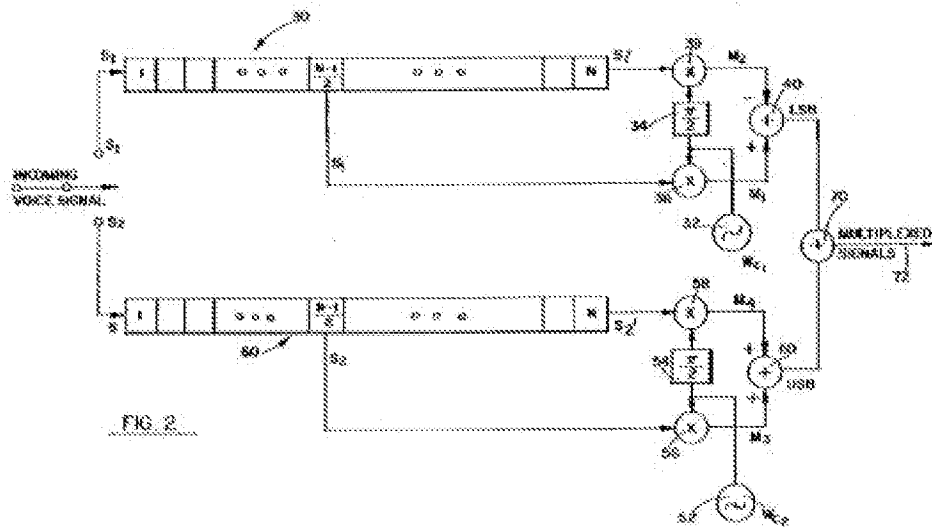
4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which

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said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1, 4, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daoud et al. (US 4835791) (disclosed in the IDS filed on 01/23/2006) (hereinafter Daoud) in view of Muzzi et al. (US 3628155) (hereinafter Muzzi).**



#### Regarding claims 1 and 4:

As shown in figures 1-3, Daoud disclose a modulation apparatus comprising:

- a first frequency-increasing single side band (SSB) modulator (**50 in figure 2**) that performs SSB modulation on a first input symbol (**S2 in figure 2**) to obtain an upper side band (USB) signal (**USB in figure 2**) (col 2, lines 29-47);
- a second frequency-increasing SSB modulator (**30 in figure 2**) that performs the SSB modulation on a second input symbol (**S1 in figure 2**) to obtain a lower side band (LSB) signal (**LSB in figure 2**) (col 2, lines 29-47); and

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- a combiner (**70 in figure 2**) that combines the USB (**USB in figure 2**) signal and the LSB signal (**LSB in figure 2**) (**col 2, lines 29-47**),
- wherein the second frequency-increasing SSB modulator performs SSB modulation to obtain the LSB signal using a carrier frequency, the carrier frequency being higher than a carrier frequency used in the first frequency-increasing SSB modulator by a symbol frequency of the input symbol (**200 Hz frequency gap interpreted to be a symbol frequency. See col 4, lines 38-49**) and the second input symbol (**col 4, lines 38-49**).

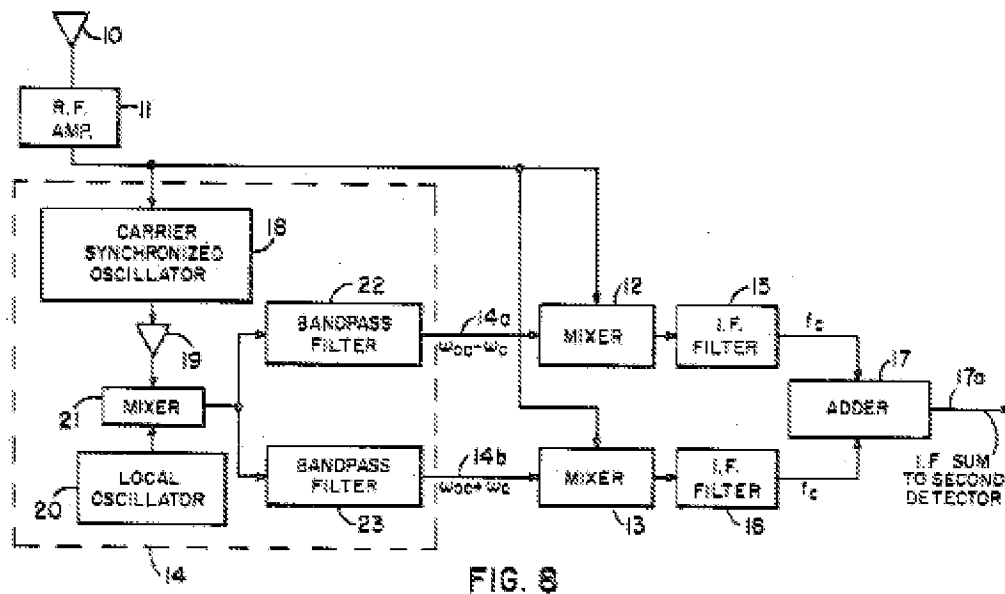
*Although, Daoud teaches that "Preferably the frequency of the second carrier signal  $wc2$  used in the upper sideband generator is slightly higher than the frequency of the first carrier signal  $wc1$  used in the lower sideband generator, so there is a frequency gap between the lower sideband signal and the upper sideband signal (see col 4, lines 38-49), it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Daoud to switch the carrier frequencies ( $Wc1$  and  $Wc2$ ) of Daoud and applying  $Wc2$  to the LSB modulation and  $Wc1$  to the USB modulation in order to yield predictable results (see KSR – some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art teaching to arrive at the claimed invention)".*

Daoud discloses all of the subject matter as described above including a multiplexing summer (**70 in figure 1**) which produces multiplexed signals (**see the output of the summer 70 in figure 1**) except for specifically teaching such

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that the LSB signal and the USB signal are multiplexed in the same frequency band.

However, Muzzi in the same field of endeavor teaches such that the LSB signal and the USB signal are multiplexed in the same frequency band (**figure 4, 17 in figure 8, col 2, lines 16-28**).



Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to substitute the summer as taught by Muzzi to for the summer of Daoud in order to obtain predictable results (**KSR – simple substitution of one known element for another to obtain predictable results**).

#### Regarding claims 6 and 8:

Daoud further disclose demodulation apparatus (**see figure 3**) for demodulating a signal combined by the combiner (**70 figure 2**) in the modulation



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apparatus (**see figure 2**) according to claim 1, the demodulation apparatus comprising:

- a first frequency-decreasing demodulator (**82, 86, and 90 in figure 3**) that demodulates an input modulation signal by a cosine curve with a first carrier frequency ( **$W_{c1}$  in figure 3**) to obtain a first demodulation signal (**see the first demodulation signal provided by first demodulator in figure 3**) (col 4, lines 38-49, col 5, lines 43); and
- a second frequency-decreasing demodulator (**84, 88, and 92 in figure 3**) that demodulates the input modulation signal by a sine curve with a second carrier frequency ( **$W_{c2}$  in figure 3**) to obtain a second demodulation signal (**see the output of 84, 88, and 92 in figure 3**), wherein
- the second carrier frequency ( **$W_{c2}$  in figure 3**) is higher than the first carrier frequency ( **$W_{c1}$  in figure 3**) by the fundamental frequency of the first input symbol (**S2 in figure 2**) and the second input symbol (**S1 in figure 2**) (**see the second demodulation signal provided by second demodulator in figure 3**) (col 4, lines 38-49, col 5, lines 43).

***Allowable Subject Matter***

6. Claims 9-112 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record, Daoud does not teach or suggest wherein the symbol frequency of the first and second input symbols is the bandwidth of each of the first and second input symbols.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KABIR A. TIMORY whose telephone number is (571)270-1674. The examiner can normally be reached on 8:00 AM - 4:30 PM Monday-Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KABIR A TIMORY/  
Primary Examiner, Art Unit 2611